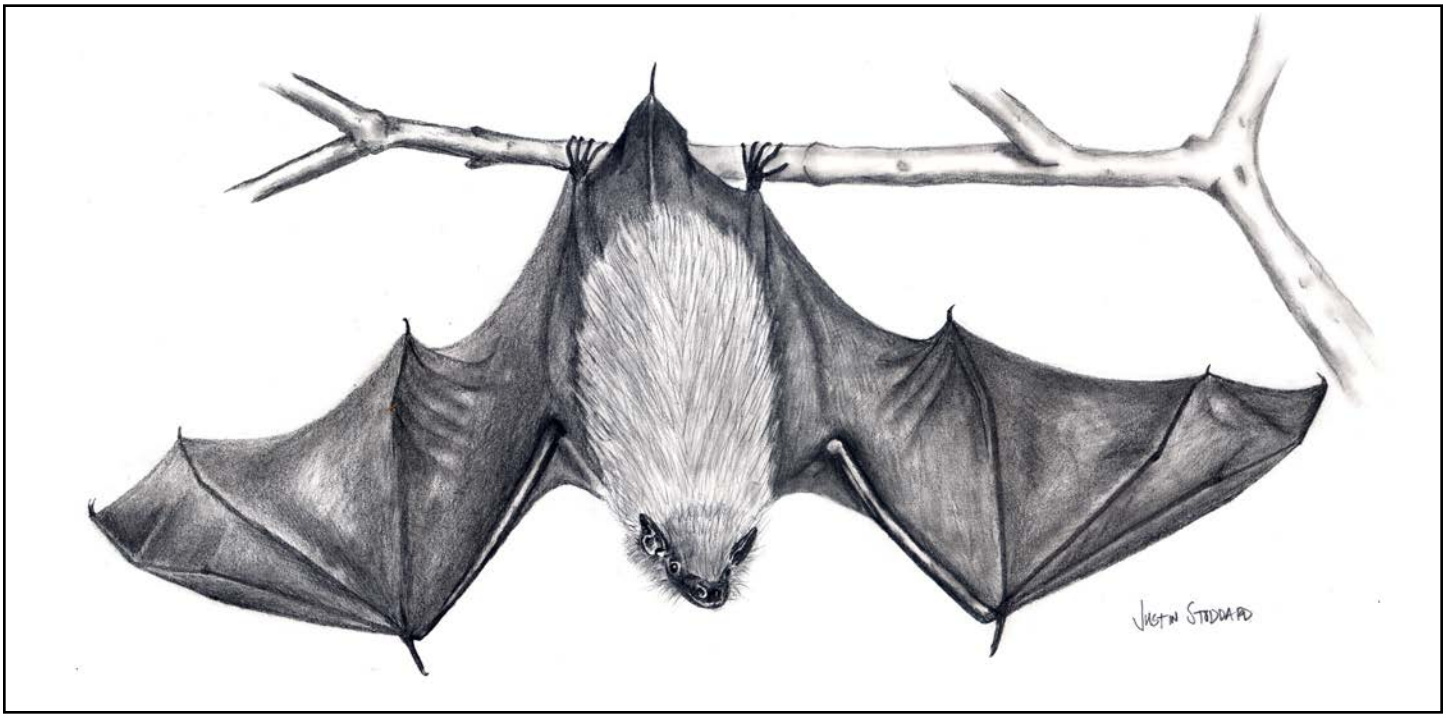
Big Brown Bat

(Eptesicus fuscus)



Bats comprise a large and extraordinary order of mammals. At latest count, the order is believed to comprise an astounding 202 genera including over 1,100 species across the world. Among these species are 65 species of flying foxes, some of which attain a wing span of up to five feet. Compare that with the smallest of all bat species, the hog-nosed bat, *Craseonycteris thonglongyai* with a weight that ranges from 0.06-0.07 of an ounce (1.7-1.9 g) and a body length of slightly over an inch (2.54 cm). The extraordinary quality of bats is that they are the only mammal capable of powered (true) flight.

Utah is home to 18 species of bats, including the big brown bat, *Eptesicus fuscus.* In Greek, *Eptesicus* means house flyer. The Latin word, *fuscus,* denotes dark brown. Pairing the words together we arrive at a very practical "brown house flyer." Based on its binomial nomenclature, the big brown bat has long been associated with humans and their dwellings. Its common name, big brown bat separates it from the little brown bat (aka little brown myotis) by its larger size.

The association of big brown bats with humans lies in the occasional shared occupancy of homes and structures. Human structures are only used as a convenience, rather than necessity. Other than providing opportunistic shelter, this species derives no other benefit from man. Gaining entry to man-made structures is easy, where there is warped siding or eaves. Only a very small opening is required.

Bats do everything possible to avoid close contact with man, even though they take advantage of man-made buildings. If a bat accidentally enters one of our living spaces, it's the bat that needs to worry—not the other way around. Once a bat is observed, humankind launches preemptive strikes with every ground-to-air weapon at hand. Brooms, mops, and tennis rackets are among the most popular. Meanwhile the only thing on the bat's mind is a quick escape, which is made all the more difficult with wildly thrashing objects in its path.

DESCRIPTION

Without knowing it, we are probably more familiar with this species than most others, because of its close association with human habitation, which makes for frequent and easy viewing. At night, we may catch a glimpse of its erratic aerial maneuvers, but under less than optimum viewing conditions, most bats look pretty much the same, except to the trained eye. Differences from one species to the next are discerned while having a bat in the hand (a gloved hand) or while studying a museum specimen.

The big brown bat is a relatively medium-sized bat with a body length of 4 to 5 inches (10-12 cm). Its fur is long, glossy and clean. The coloration of the big brown bat's topside fur is most commonly a rich chestnut brown, although other colors also occur. Variations include reddish brown, copper, or dark brown. Color phases are often a result of

geographic location. The fur on top is darker than that on the underside, which is rather pale. Known as counter-coloration, the pattern of dark over light is common throughout the animal world.

Although other mammals appear to fly, such as the flying squirrel, bats are the only mammal capable of true flight, made possible by a skin membrane that extends from their incredibly long phalanges (fingers) to their lower limbs and from there to the tail. Only the head and trunk are membrane-free. The forearm of a big brown bat is about half the length of its body, measuring 1.5 to 2 inches (3.8-5 cm) with a wingspan that stretches 13 to 16 inches (33-40 cm). The tail is an impressive 4 to 5 inches (10-12.7 cm), which is nearly the same length of the body. Body weight ranges from 0.5 to 1.2 ounces (14.2-34 g) with females a bit heavier than males. They have fleshy lips and the nose is broad for the size of the face. Their wing and tail membranes are as thin as paper and black in color, as are the ears, which function like radar dishes. The ears are also rounded and the tragus is broad with a rounded tip. A tragus is a fleshy projection that covers the entrance of the ear. Because each species of bat has a different shaped tragus, it can be used to help identify them.

DISTRIBUTION and HABITAT

The big brown bat is a common bat, ranging from southern Alaska and Canada to northern South America and on some islands of the Caribbean. The genus of which it belongs (*Eptesicus*) occurs widely, although no single species is worldwide in distribution. This species is a generalist in its habitat selection, seemingly showing little preference for feeding over water versus dry ground, forests versus clearings, or urban versus rural environments. Vegetation associations include sagebrush, grassland, pinion-juniper, greasewood, rabbitbrush, aspen, ponderosa pine, meadow and shrubland. In short, every plant community within its geographic distribution is home to the big brown bat.

In Utah, the big brown bat is one of the most widespread and abundant bats. It can be found state-wide, with the possible exception of the West Desert area. Preferred habitats for the species in Utah include woodland and urban areas. They are nocturnal and during the day roost in buildings, caves, mines, rock crevices, and trees.

LIFE HISTORY

Snow Birds or Hibernators?

Some big brown bats move to southerly climes as winter approaches though most hibernate. We see bats from late spring to early fall. Thereafter, they seem to disappear. If not traveling southward, their habitation is a winter roost that tends to be in well-protected human habitations or subterranean locations such as caves or mines, where temperatures remain stable and above freezing. Unlike most hibernators, big brown bats are known to roost fairly close to cave and mine openings, and to occasionally be active on winter nights as far north as Canadian prairie provinces. Of all bat species, the big brown bat seems to be among the most cold-tolerant.

Probably the biggest source of winter mortality is a failure to accumulate enough fat during summer months. This is particularly true of 1st year and young animals. The degree to which body functions of the big brown bat slow down is remarkable. Depending on the source you may read, their heart rate may fall anywhere between 4 to 20 beats per minute. The range is likely attributable to how close the hibernaculum approaches freezing. As ambient temperatures take an upward swing, so does the heart rate. The heart rate of an active big brown bat ranges from 800 to 900 beats per minute. By the time insects appear and normal feeding resumes, a brown bat may have lost as much as 25% of its pre-hibernation body weight. That's why it prepares for winter by consuming as much as 0.1 ounces (2.7 g) of insects per night. A pregnant or lactating female may consume her body weight in insects each night.

Hunting and Diet

The big brown bat, like many other bats, navigates and hunts by echolocation, the airborne equivalent of sonar. When echolocating bats scan their environment as many as 1,000 times per second, gaining an incredibly precise picture of their surroundings. They can detect an object as thin as a human hair. An interesting fact relating to their hunting prowess is that big brown bats are reported to be one of the fastest bats, capable of reaching speeds of up to 40 mph (64 km/h). Catching insects at that speed takes a highly evolved sensory system. As big browns close in on prey, their rate of pulsing the air accelerates to a buzz for those able to hear the high frequency sound.

Big brown bats emerge about a half hour after sunset and eat until satiated. An individual may follow a nightly routine, moving from a particular treetop to another and back again. As mentioned earlier, they are adept at finding suitable hunting grounds. Insect-rich environments also include marshes, wetlands, and around street lights that attract insects. Like most bats, insects are on the menu. The only difference is the kind of insect consumed most frequently. Big brown bats specialize in beetles although other larger insects such as moths, stink bugs and leafhoppers may be consumed. Like most other bats, the big brown doesn't feed in heavy rain or when the air temperature drops significantly.

Sociality and Reproduction

Both male and female big brown bats reach sexual maturity at two years of age. Upon reaching sexual maturity, browns will mate promiscuously before entering hibernation. The big brown bat is mostly solitary, although they may congregate into small colonies during the spring and summer. During winter months, pregnant females often separate and will overwinter in maternal colonies. Following mating, delayed fertilization occurs, where the sperm is stored and development of the embryo is delayed. Once embryonic development begins, there's a 60-day lapse until birthing, which takes place in May or early June, when an abundance of insect life appears.

A mother big brown bat gives birth to singles or twins. In the eastern part of the United States, the species usually produces two young, whereas bats in the western United States produce only one. During delivery, the mother hangs right side up and then catches and cradles her young in the skin membranes between her thighs. Pups are born feet first. Pups are born blind with no fur and are completely dependent on their mother for nourishment. At birth the young bats weigh about 0.1 ounce (2.8 g). They grow quickly, gaining as much as 0.02 ounces (0.5 g) per day.

The pup or pups feed by crawling to the mother's nipples. She will nurse her young for 3 to 4 weeks until they learn to fly and feed independently. For the first few days, the young may accompany their mother on her nightly forays. Later, the baby or babies remain behind, clinging to the wall or roof of the cave or shelter. The mother communicates with her young with a series of squeaks. If a baby bat is separated from its mother, it will squeak continuously. The squeaking can be heard for more than 50 feet (15.2 m), enabling the mother to pick up the baby and return it to a safer location.

Hazards and Longevity

Big brown bats can live 18 to 20 years in the wild, provided they are able to avoid the many hazards they are subject to. In one documented case, a big brown bat was known to live as long as 30 years. Unfortunately, most big brown bats die during their first winter, because of starvation during hibernation. Young bats are also subject to frequent accidents and hunger due to poor hunting skills. Others succumb to predators, parasites and disease.

Roosting locations can leave them vulnerable to predation by ground and aerial predators such as snakes, rats, cats, raccoons, skunks, owls and humans. Of these, humans pose the greatest threat by killing entire colonies when roost sites are located, destroyed or boarded up.

One of the greatest threats in recent years is a fungus, known as "white-nose syndrome" that has been observed to grow on the faces of bats and in some cases invade their bodies. The fungus appears to cause disturbed hibernation, resulting in the loss of important metabolic resources. Mass die-offs can occur. At some hibernacula, mortality rates have been as high as 90%. A team of biologists, researching the fungus, suggest that the white-nose syndrome has the potential of wiping out entire populations, unless some means is found to control it.

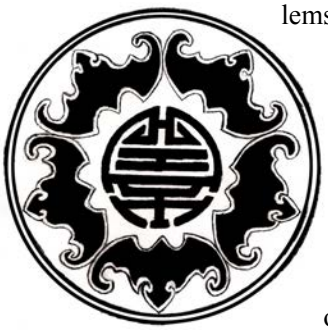
Certain species of bats that commonly roost in trees are killed in large numbers by wind turbines. It's unknown if they are attracted to the turbines or if they are simply in the wrong place at the wrong time. Most mortality occurs during fall migration or during the mating season. As wind farms proliferate, the problem becomes an ever greater problem for scientists as they seek to understand the connection. Recent research implicates barotrauma as a primary cause of death. As a bat flies between turbine blades, their lungs hemorrhage from the sudden zone of low pressure created by air currents flowing over the blades.

BATS and PEOPLE

Bats are an often maligned and misunderstood member of the animal kingdom. They are often associated with monster movies, vampires and other cultural myths. Despite the fear bats evoke in some, they also draw curiosity and fascination.

Some people think bats are uncommon or rare. The apparent rarity is due to the fact that they are difficult to see and hear. Unless back-lit by a street light or the moon, bats are quite invisible unless we deliberately look for them. The sound of their flight is like a passing whisper. The main give-away is the occasional clicking or buzz that may be heard as the bat hunts and closes in on its prey.

In China, bats are regarded in a positive way, where they are considered a symbol of happiness and good luck. Other cultures are similarly unaffected by Western prejudices. Problems can arise when people pick up and handle a sick or injured animal. When captured and restrained, big brown bats can be feisty and will readily bite, using stout, needle-like teeth. They cannot produce a serious wound, however. When handled, they may squeal or produce a ratchet-like sound.



Chinese Good Luck Emblem

The greatest threat comes from the viruses, fungi and other pathogens bats may carry. Rabies is the best known. In company with dogs, foxes, raccoons, and skunks, bats are one of the primary carriers of rabies, though less than one-half of one percent of bats have rabies. However, there's a big difference in the behavior of a rabid bat versus other rabies carriers. Whereas most rabid animals become aggressive, bats become reclusive and hide. Certainly, if the disease renders them incapable of flight, they may drop to the ground, where they can be picked up and may bite when handled.

Histoplasmosis is a disease associated with contaminated bat droppings. Infection in people occurs by inhalation. Symptoms vary greatly, but the disease primarily affects the lungs. If untreated, it can be fatal. Histoplasmosis is caused by a fungus that grows in soil or material contaminated with droppings from various animals, including bats.

Despite the many myths and fears people associate with bats, they are an extremely beneficial animal. A colony of 150 big brown bats can consume enough adult cucumber beetles in one summer to prevent egg-laying that would produce 33 million root worm larvae, which are a major pest of corn. Other damaging pests are fed upon, although beetles top the charts on their menu. Because so many crop-destroying insects are eaten, some farmers build bats boxes under bridges or on buildings to encourage their use as bat maternity roosts.

CURRENT STATUS and MANAGEMENT

All Utah bat species are protected by Utah law. It is illegal to intentionally kill bats. The big brown bat is common throughout its range.

Because of its roosting habits, the big brown bat is especially vulnerable to persecution by people. Also, relative to other mammals, it is extremely susceptible to poisoning from man-made pesticides, which are concentrated in its milk, embryos, and adult tissues.

WHAT YOU CAN DO

• Contribute to wildlife through the Wildlife Tax Check-off on the Utah State Income Tax form or by making a contribution directly to the Utah Division of Wildlife Resources, 1594 W. North Temple, Suite 2110, Salt Lake City, UT 84116. You can also purchase a wildlife license plate, which helps bats and other wildlife.

• Join bat conservation organizations such as Bat Conservation International, an organization dedicated to the conservation of bats. Visit their website at http://www.batcon.org for information.

• If there is potential for bat problems in your home, only bat-proof your house when colonies are not present to avoid imprisoning them or excluding mothers from their young.

• Build and install a bat box to create potential bat areas for bats to roost.

ADDITIONAL READING

Barbour, R. W., and W. H. Davis. 1969. Bats of America. University Press of Kentucky.

Zeveloff, S. I. 1988. Mammals of the intermountain west. University of Utah Press.

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